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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,462	10/29/2003	Jene A. Golovchenko	HVD2093	5987
26247	7590	08/30/2006	EXAMINER	
THERESA A LOBER T.A. LOBER PATENT SERVICES 45 WALDEN ST CONCORD, MA 01742			RIELLEY, ELIZABETH A	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

5/1

<b>Office Action Summary</b>	<b>Application No.</b> 10/696,462	<b>Applicant(s)</b> GOLOVCHENKO ET AL.	
	<b>Examiner</b> Elizabeth A. Rielley	<b>Art Unit</b> 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8-12,15 and 31-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-12,15 and 31-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

Amendment filed 6/19/06 has been entered and considered by the Examiner. Claims 7, 13, 14, and 16-30 have been canceled; claims 31-33 have been added. Currently, claims 1-6, 8-12, 15, and 31-33 are pending in the instant application.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1-6, 8-11, 15, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al (US 6297063) in view of Hunt et al (US 20020167374).

In regard to claim 1, Brown et al ('063) teach a carbon nanotube device comprising a substrate (10; column 4 line 10 to column 5 line 27); at least one pair of electrically conducting contact pads disposed on a selected one of the front and back substrate surfaces and separated by an aperture (12a; see figure 5b); a carbon nanotube catalyst region (26) on top of each of the contact pads and exposed at the selected substrate surfaces (see figure 5b); and at least one carbon nanotube extending across the aperture (14; column 1 lines 26-52; figure 6c also teaches the carbon nanotubes extending horizontally) and each end of the carbon nano tube located on top of an exposed catalyst region at the selected substrate surface (see figure 5b). Brown et al ('063) are silent regarding the limitations of the substrate including an

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aperture extending from a front surface to the back surface, wherein each of the carbon nanotubes are accessible through the aperture from both the front surface and the back surface of the substrate. In the same field of endeavor, Hunt et al ('374) teach a carbon nanotube device (figure 11) wherein a substrate (not numbered; bottom part of 14 and 16; paragraph 71) comprises an aperture extending from a front surface to a back surface of the substrate (not numbered; see figure 11), and at least one carbon nanotube extending across the aperture and accessible through the aperture from both the front and back surfaces of the substrate (see figure 11). Accordingly, Hunt et al exemplifies the art recognized equivalence of suitable geometric configurations of suspended nanotubes (paragraph 71, third sentence), thus, one skilled in the art at the time of the invention would reasonable contemplate modifying the carbon nanotube device of Brown et al to incorporate the geometric configuration of suspended nanotubes of Hunt et al, since the selection of either art recognized equivalent assemblies would be considered within the level of skill in the art.

In regard to Applicant's recitation of the carbon nanotube catalyst region comprising a solidified vapor deposit, the Examiner notes that the recitation is considered a product by process limitation. It has been recognized that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on it's method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process," *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113. Therefore, Accordingly, Brown et al's teaching of a carbon nanotube catalyst is considered to meet the claimed recitation.

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In regard to claims 2 and 3, Brown et al ('063) teach the carbon nanotube comprises a single-walled carbon nanotube or the carbon nanotube comprises a multi-walled carbon nanotube (column 6 lines 15-47).

In regard to claims 4 and 5, Brown et al ('063) teach the carbon nanotube comprises a semi conducting carbon nanotube; the carbon nanotube comprises a metallic carbon nanotube (column 5 lines 28-55).

In regard to claim 6, Brown et al ('063) teach the at least one carbon nanotube comprises a plurality of carbon nanotubes (see figure 1).

In regard to claim 8, Brown et al ('063) teach the support structure comprises a semi conducting substrate<sup>1</sup> (column 4 lines 38-63).

In regard to claims 9-11, Brown et al ('063) teach the support structure comprises a membrane; the membrane comprises a silicon nitride membrane; the membrane comprises a silicon dioxide membrane (26; column 4 lines 24-37).

In regard to claim 15, Brown et al ('063) teach at least one pair of electrically conducting contact pads comprises a plurality of pairs of contact pads disposed at locations around the aperture (see figure 1).

In regard to claim 31, Brown et al ('063) teach the catalyst region is less than about 2 nm thick (column 4 lines 24-29).

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<sup>1</sup> <http://www.onelook.com/?w=substrate&ls=a>. The contact pads are considered a substrate.

In regard to claims 32 and 33, Brown et al ('063) teach the catalyst region (26) covers a portion and substantially the entirety of a contact pad (12a; see figure 5b).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al (US 6297063) in view of Hunt et al (US 20020167374) and in further view of Bradley et al (US 20040043527).

Brown/Hunt teach all the limitations set forth, as described above, except the support structure is aligned between a source of electrons and an electron detector for transmission electron microscopy of the carbon nanotube. In the same field of endeavor, Bradley et al ('527) teach a carbon nanotube device comprising a support structure holding a nanotube (230; paragraphs 55-56) is aligned between a source of electrons (150, 240) and an electron detector (260) for transmission electron microscopy of the carbon nanotube in order to decrease the electrical resistance of the measuring device (paragraph 44). Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to modify the nanotube structure of Brown et al ('063) to incorporate the measuring device of Bradley et al ('527). Motivation to combine would be to improve the measuring device's accuracy.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-6, 8-12, and 15 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

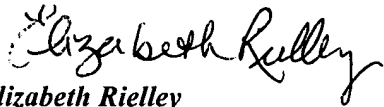
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth A. Rielley whose telephone number is 571-272-2117. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained

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from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**Elizabeth Rielley**

**Examiner**

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**MARICELI SANTIAGO  
PRIMARY EXAMINER**